

Metropolitan Toronto

Government  
Publications



# METROPOLITAN TORONTO AND REGION TRANSPORTATION STUDY

[General publications]

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G-9] A NEW LOOK FOR COMMUTERS IN CANADA

by

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TECHNICAL ADVISORY COMMITTEE.

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## ABSTRACT

The Ontario Provincial Government ordered the establishment of the Metropolitan Toronto and Region Transportation Study in December, 1962. The region encompasses some 3,200 square miles and 85 municipalities from Hamilton to Oshawa and north to Barrie and Guelph. The objective of the Study is "to study and report on an overall transportation policy for Metropolitan Toronto and surrounding municipalities." In its earliest deliberations, the Study considered that the potential of commuter rail transport was an unknown and possibly essential mode of public transportation. Studies of physical and market feasibility were undertaken and a recommendation made to the government. In a bold, and unprecedented, decision the government accepted the recommendation for a trial commuter rail project on the 52-mile lakeshore line passing through downtown Toronto with a deficit between operating costs and revenue to be met by provincial funds. An outline of some of the details of design and decision leading to inauguration of the Government of Ontario Transit operation in the late spring of 1967 are presented. Market and service surveys and analysis proposals, which are one of the main reasons for the project are also outlined.





## Introduction

Transportation -- the total movement of goods and people -- is undoubtedly the life-blood of our communities, our province and our nation. Without it, our economy can wither and die; and without a strong, vibrant economy the population of our province and its major producing communities would stagnate and lapse into dormancy.

Today I intend to deal with one aspect of the research being conducted by the Metropolitan Toronto and Region Transportation Study to demonstrate the positive developments and acquaint you with the research program related to it for the future.

The specific project is the provincial government's commuter rail service which will go into operation next year along the shores of Lake Ontario between Hamilton and Dunbarton, 20 miles to the east of Toronto. This is the first fully planned and designated commuter rail service ever proposed in Canada. Operational management is the responsibility of the Minister of Highways, with a



small group within that Department, and daily operations, the responsibility of a Superintendent of Commuter Services within the Canadian National Railways.

Before dealing further with the project itself, let us look at the history that led the Ontario Government to enter the rail commuter field. The catalyst was the plight of Metropolitan Toronto. Faced with a mounting demand for expansion of its rapid transit system, but under severe financial strain to do anything about it, municipal authorities appealed to the provincial government for aid.

In an important change of policy the government decided that subway rights-of-way should be considered in the same category as expressways and made funds available on that basis. As a result, some \$10 Million have gone toward subway construction up to the end of last year.

The problem that faced Toronto in moving people was not an isolated one. The tremendous change in post-war living habits that brought about a headlong rush to suburbia was causing a steadily-mounting pressure on our highways.









A TOPOGRAPHIC PERSPECTIVE OF THE **MTARTS** REGION SHOWING ORIENTATION OF REPRESENTATIVE MUNICIPALITIES AND MAJOR LAND FEATURES.



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With confidence in the long-range growth possibilities for this southern region of the Province commonly known as the Golden Horseshoe, the government decided late in 1962 to launch an investigation to devise an integrated transportation system. A system that would make the most efficient use of all modes of transportation to handle an expanding population.

Certainly, this move is a radical departure in transportation planning when it is realized that for a great number of years the Province had confined its transportation programs to rural roads and the Ontario Northland Railway.

A number of important developments that could have bearing on transportation planning for the future led to the creation of the Metropolitan Toronto and Region Transportation Study which has been engaged in the investigation for almost 4 years.

#### Reasons for Regional Approach

Firstly, the increasing heavy expenditures for freeway construction in this region prompted a closer examination of road requirements. As fast as new and costly routes





were being built, and existing routes expanded, they immediately became congested or became congested within a few years. In one sense, this could be called good highway planning.

Secondly, the problems of financing public transit in the area --- in particular, subway construction in Metropolitan Toronto --- motivated the province to attempt to define its responsibilities more clearly.

Thirdly, in recent years there has been extensive interest in extended commuter railway services, largely caused by the plans of the C.N.R. and C.P.R. to decentralize their freight assembly operations, and the resulting availability of rail facilities leading into downtown Toronto. In addition, the very active policies of the C.N.R. in long haul passenger rail marketing are of considerable importance.

Although there was a provincial interest in these developments none of them particularly fitted into the existing responsibilities of any particular department of the Ontario Government. The circumstances clearly indicated a need for special investigation.





### Regional in Scope

Another unprecedented feature of this project is its extent, covering a region surpassing the limits of any municipal authority, including Metropolitan Toronto.

The study covers a region including Oshawa on the east, Hamilton on the west, and the cities of Guelph and Barrie in the northwest and north. 90% of the population of the region is located within the planning area of Metropolitan Toronto.

However, the commuting shed of Metropolitan Toronto extends beyond the planning area; the arterial character of major routes extends as far as the nearby cities; and the railway network extends well into the Study region. Furthermore, it is evident that the present and future influence of Toronto extends beyond the planning area. This is further confirmed by the report of the Royal Commission on Metropolitan Toronto presented by H. Carl Goldenberg in 1965.

The area of the Study is some 3,200 square miles. There are some 35 urban and rural municipalities in this area. The 1964 population was about 2.9 million persons



and if present trends continue, will approximate 6.4 million by the year 2000. It is estimated that this growth, and the economic expansion that must accompany it, will require an expenditure of more than \$2.5 Billion on transportation during the next 20 years, and that figure could climb to \$4 Billion by the end of the century.

If travel in the future is confined to the automobile, it is obvious that flexibility of movement could become severely restricted even with heavy expenditures on expressways and general road facilities.

#### Inter Agency Operation:

Another important characteristics of the problem was the number of agencies involved, none of them having overall authority to carry out such an investigation. Overlapping freeway systems exist under the control of Metropolitan Toronto and the Department of Highways. A number of bus and transit companies also operate in the area, in addition to the two railways companies.

These factors, then, were the prime considerations that led to the creation of the Metropolitan Toronto and Region Transportation Study, one of the first bold large-





scale approaches to regional transportation planning to be undertaken in Canada.

A feature of the conduct of this Study has been the strong representation by the various planning and transportation agencies. During the program of the Study, this participation has continuously extended. It is felt that this broadening of the base ensures the validity of the results by the application of the knowledge and experience available. It is also hoped that such a procedure will mean that the findings of the Study will have a greater impact on the policies and programs of regional transportation agencies than would be the case if the work was carried out in an isolated fashion.

#### Organization of the Study

Briefly, the organization stipulated by Order-in-Council of the Provincial Government consists of two committees:

An Executive Committee -- The Ministers of Transport, Municipal Affairs, Economics and Development and Highways plus the Chairman of Metropolitan Toronto.





A Technical Advisory Committee -- with senior officials from the Department of Highways, Transport, Municipal Affairs, Economics and Development, the Metropolitan Toronto Planning Board and the Metropolitan Toronto Roads Department, the Canadian National Railways and the Canadian Pacific Railway, and the former general manager of the Toronto Transit Commission.

To these management committees have been added a number of subcommittees on special aspects of the Study, and a 16 man Study Staff. At an early stage it was established that the investigations would be done by a small control staff. Additional staff time would be provided where possible by the existing agency organizations and a number of individual consultants and consultant firms.

The degree of coordination and cooperation has been encouraging.

#### Objectives of the Study

In its initial document, the Prospectus, the Study describes its three main objectives as being:

1. to study the possibilities for coordination of transportation









Objectives of the Study cont'd...

2. to define Provincial policies in transportation
3. to recommend financial and administrative arrangements.

Accomplishments

In reaching for these objectives the Study can credit four significant accomplishments:

1. A technique for simulating and analyzing the vast and intricate phenomenon that is regional transportation - a regional trip prediction model.
2. An examination of the more functionally ideal patterns of growth in the region for the future for a determination of the relative advantages of alternative prospectus in terms of regional transportation - regional growth plans.
3. A provincial interagency multi-discipline approach to the assessment of regional transportation problems - a working committee approach.
4. A demonstration or actual test of a regional public transportation mode, which represents a major issue in our study - the commuter rail project.





Initiation of Commuter Rail Study

It is the latter - the commuter rail project - to which this paper is directed. An outline will be made of some of the various steps, procedures, decisions and policies which have been required to make the project operational. In addition, some of the "research" objectives will be indicated - these being the primary *raison d'etre* for the project.

A special directive to the Study, immediately following its formation, called for an investigation into the possible use of regional rail facilities. Or put another way, if regional transportation was to be studied there was little local knowledge of the potential impact that regional rail facilities might have.

Basically it seems to us that the railroad rights-of-way (as do freeways) create considerable barriers or dividers in land use, but a unifying influence at least in station areas. These rights-of-way represent an inherent "plant" value which, with suitable modifications, might provide an ability for the short haul movement of people. It would seem to us that this "plant" value should not and cannot be ignored.









### Physical Feasibility

In 1963, then, a preliminary study was ordered of the rail lines in the area. The purpose of this study was to obtain an up-to-date inventory of the railway facilities and rights-of-way on each line, and to determine which lines could carry commuter or rapid transit services either by using the existing facilities or by constructing additional facilities on the present rights-of-way.

Five classes of operation were defined in approaching the assessment:

1. Limited Commuter Service - 1 or 2 trains at peak only. Capacity 1200-2400 seated per hour one-way
2. Intermediate Commuter Service - 20 minute average headway at peak, 60-minute off peak. Capacity-3600 seater per hour one-way.
3. Maximum Commuter Service - 10 minute average headway at peak, 60-minute off peak. Capacity - 7200 seated per hour one-way.
4. Intermediate Capacity Rapid Transit - 6 minute average headway in peak, 30-minute off peak. Capacity-1500 seated per hour one-way.
5. High Capacity Rapid Transit - headways similar to "Intermediate" but more sophisticated equipment. Capacity-40,000 per hour one-way.



There are 15 rail lines in the study area, covering some 230 miles of track. The inventory revealed that facilities would be available, or could be constructed, on the existing railway rights-of-way which would enable commuter services to operate over almost all of the lines in the area. Most of the lines could handle Limited Commuter Service, with minor improvements in the existing facilities. Services of this nature could be accommodated on 250 miles of railway. On some of these lines, a more frequent service could be handled without extensive construction of new facilities. This is the case on approximately 30 route miles.

For the most part, separate facilities would be required for rapid transit services. The study showed that these could be provided over some 60 miles of line.

It was evident that the railway lines radiating out from the central area could provide a valuable addition to a regional transportation system. Existing facilities, or additional facilities located on the railway rights-of-way would be capable of carrying commuter or transit trains seating up to 1200 passengers. These could handle in excess of 45,000 passengers into or out of the downtown





area during peak hour periods. The study showed that it is physically possible to operate commuter and rapid transit tracks on rights-of-way in the area. Further studies would be required to establish the demand for these services and supply essential information on the economics of operation.

### Market Feasibility

The physical feasibility report was received in late 1963. The Committee in the spring of 1964, ordered a market feasibility study be done. An assessment of the physical feasibility study together with the objective judgement of the committees suggested restraints for the market study. These restraints were:

1. on the basis of possible cost, -- commuter rail service of intermediate capacity was to be considered
2. on the basis of existing and probable population distribution -- the investigation would be confined to the lakeshore rail lines between Burlington and Ajax.

The study objective was, therefore, to determine engineering requirements; patronage, fare and service relationships; and costs for a service along the Lakeshore railway line between Ajax and Burlington, or any part thereof. Such a commuter service would be



carried out for a fixed period of time in order to measure relationships between market potential, fares, service frequency and other characteristics which can apply to regional rail-commuter prospectus. The commuter rail service would serve, in effect, as a market evaluation for rail commuter patronage.

The study reported that for 1964 there were about 38,000 residents in the rail study corridor who travel daily to work in the downtown area of Toronto by automobile and public transportation. Patronage for the trial service would come mainly from these regular commuters. Additional patronage would be derived from persons travelling into Toronto for other purposes such as school, shopping, personal business or entertainment. The study defined the "corridor" or "catchment areas" as being within 5-minute walk or a 10-minute drive with the nearest proposed in-board stations being 6-7 miles either side of Union Station (or downtown Toronto). It will be noted that the market area considered for the lakeshore line proposal is relatively restricted.

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Using the general methods developed to date for predicting patronage potential for commuter rail services, it is estimated that about 7500 (1964 estimates) persons would arrive at Union Station during weekdays. 75% of these trips would occur during the peak period. Annual patronage was estimated at 4,000,000 person trips, anticipating the Bloor-Danforth subway impact on the market area. Inter-station movement other than to downtown Toronto was not estimated, since by judgment it would be relatively minor initially, compared to the suburban-downtown movement.

The 1964 population, in the effective rail corridor, was about 568,000 persons and the estimated 1980 population is to be about 1,000,000 persons. Of the person work trips, within rail corridor travelling 5 miles or more in an east-west direction, 75% are made by automobile and 25% by public transportation.

#### Marketability Factors

The survey of the lakeshore corridor population was designed to determine the desirable features that would attract people to the service. In analysis, these features could be separated into three primary categories. The



features are not particularly startling, being within the experience and judgement of those close to transportation. The interesting point being that none were more particularly desirable to the public than another (though they are listed here in order of preference), and therefore in combination, represent the image of desirable public transportation.

CONVENIENCE: Today's traveller wants to move freely, with a minimum of complication and delay. In our case, great emphasis was placed on frequency of service, convenience of parking, ticketing, boarding and leaving trains. But most of all, once aboard the train he wants to get there quickly. In our age of jet-speed travel, the accent is mobile flexibility, speed, and freedom from irksome complications.

COMFORT: Great emphasis was placed on a clean, attractive environment to reduce the drudgery of commuting. This ranges from comfortable seating to induce relaxation to convenient ashtrays, airconditioning, tasteful interior decor and no-glare lighting. In other words, the passenger has to be given all the comforts that he has come to expect from the prosperous climate in which he lives -- he has to be pampered.





ECONOMY: Curiously enough, our survey found that economy of travel was not a prime factor standing alone. For the large number who said that they would use the service, if it was less costly than car commuting, there was almost as many who said they would pay as much, or more, to use a comfortable and somewhat convenient commuter service as it cost to commuter by car.

#### Frequency of Service

Quite naturally, before the estimated patronage for a given service can be determined some initial concept of that service must be established. Two physical restraints became obvious during the study. The first was the limited number of platforms (or space to add platform tracks) at Union Station. This was further affected by the number of long haul passenger trains which also use Union Station and the present methods of passenger and train handling. The second was the density of freight train movements and the mixing of these with regular scheduled frequent commuter train movements in a start-stop operations every few miles.



It was demonstrated that a minimum of 20 minutes between following commuter passenger trains could be accommodated. This however, was the minimum without the expenditure of substantial sums of money.

Similarly, it was demonstrated that hourly off-peak commuter train headways could be operated as a minimum.

The market feasibility attempted to determine the modal split of the "in-scope" person trips by rationalizing the varying degrees of convenience, comfort and economy available. For example a 100% increase in patronage in the rush hours was suggested as probable with a decrease in train headway from 20 minutes to 15 minutes (It would appear that the difference is likely most affected by passenger attitude towards the need to arrive in the station at a "scheduled" time rather than at a "random" time to catch a train.



Estimated peak period inbound passenger loadings  
by station were:

<u>From West</u> -	<u>From East</u>
Union Station - 0	Union Station - 0
Mimico - 680	Danforth - 430
Long Branch - 720	Scarborough - 940
Port Credit - 510	Eglinton - 640
Clarkson - 130	Guildwood - 680
Oakville - 340	Rouge Hill - 170
Bronte - 40	Pickering - 340
Burlington - 20	(Dunbarton)
Weekday Passengers - 15,000	
Annual Patronage - Weekdays	3,640,000
- Saturdays	250,000
- Sundays & Holidays	90,000

#### Station Locations

The question of locating the stations to offer the service to the greatest number of people, yet maintain a high degree of operating efficiency for the equipment and frequency of service during peak periods, necessitated the elimination of three stations between Toronto and Oakville to provide a better spacing between all stations. In terms of train operating characteristics a minimum 3 mile spacing, and preferably 4 to 5 miles, was considered desirable.





In recommending station locations we kept in mind the following considerations:

- 1 -- The number of existing and possible dwelling units within the catchment area of each station to determine potential patronage. A catchment area for this service has been defined as an area within a five-minute walk or a ten-minute ride from the station.
- 2 -- The number of persons presently using commuter trains at each of the established stations.
- 3 -- The general accessibility of the station or, more correctly, its proximity to major feeder routes (arterial roads) for bus feeder. In addition the accessibility in terms of adequate parking area potential.
- 4 -- The effect that a station would create on residential areas from the viewpoint of vehicular traffic generation and noise. In all cases we wanted to minimize the undoubted nuisance that a station could create in a residential community.



These considerations resulted in the following recommended station locations:

<u>West</u>		<u>East</u>	
Union Station Mile	0.0	Union Station Mile	0.0
Mimico	6.8	Danforth	5.2
Long Branch	9.8	Scarborough	8.8
Port Credit	12.8	Eglinton	10.8
Clarkson	16.1	Guildwood	12.8
Oakville	21.4	Rouge Hill	16.3
Bronte	25.6	Pickering	20.0
Burlington	32.0	(Dunbarton)	

#### Equipment

The feasibility study, in order to arrive at costs, considered the following possibilities.

(a) Motive Power - new or used

1. electrified rail cars
2. diesel locomotive
3. rail diesel cars
4. rail turbine cars

(b) Coaches - new or refurbished

1. standard
2. double decker.

#### MOTIVE POWER

The question of electric or gas turbine power was easily and quickly resolved under the circumstances. The cost of electrifying some 52 miles of territory for a "trial" of public attitude was obviously prohibitive, though in all probability operationally more economic.





The development of the gas turbine for application to rail equipment, at that time, had not progressed sufficiently. This left then a comparison of diesel locomotives and rail diesel cars. A judgement comparison of known costs for the supply of such equipment indicated that the diesel locomotive was most suitable, though the flexibility of the rail diesel car was recognized.

(The incongruity of a massive locomotive hauling one to four coaches can be easily visualized). The size of locomotive was also considered in relation to the train consist being considered (up to 10 coaches) and the acceleration - deceleration requirements together with the "resale value" if the project concept were changed. The result was a recommendation for diesel locomotives of the 2400-3000 horsepower size. Though great care had been taken in arriving at these conclusions events did occur which ultimately required a reassessment of the locomotive-rail diesel car comparison.

#### COACHES

It was determined that it was possible to purchase, at scrap value price, 25 to 40 year old standard coaches with a seating capacity of at least 100 persons. An



estimate of the cost of refurbishing these cars was obtained. Safety was a factor not to be overlooked, and a used coach was in fact purchased and subjected to a crushing test.

An investigation was made into the possibility of adapting the modern subway car design to a rail coach. It was determined that indeed this was possible resulting in an 85 foot coach with seating for 100 persons with a weight of 65,000 pounds as compared to a standard coach weight of 122,000 pounds.

The possibilities of the double decker passenger coach seating 140-160 passengers as used on the Chicago North-western and Southern Pacific were investigated. A comparison on weight, cost and impact on consist was made with the standard coach and a judgement made that, with the passenger potential and "trial" approach, the standard coach - for our purposes at this time - would be most suitable. No second hand double deck coaches were available.



Estimated capital costs were proposed as follows:

Refurbished second hand standard coach	\$30,000
Adapted subway design to standard coach	85,000
Double deck coach (new)	175,000

### Estimated Costs

The initial gross estimated for the commuter rail project, based on the factors previously outlined, were as follows:

Capital Costs - locomotives, Coaches, Spare Parts, Stations, Parking, Trackage - \$7,500,000

Annual Operating Costs - Fuel, Servicing, Repairs Crew Wages, Switching, Sales and Station Staffs, Casualties and Injuries, Maintenance and use of fixed facilities, Management and General Overhead, Advertising and Sales Promotion -- \$3,500,000.

### Estimated Revenue

On the basis of no change in the existing commuter rail fare schedule (about 2.6¢/mile) the passenger revenue was estimated to be on the order of \$1.5 Million.

### OPERATIONAL ARRANGEMENTS

The 52 mile territory for the proposed commuter rail project, with the exception of the Union Station area, is entirely on CNR trackage. Union Station is operated under a joint management by CNR and CPR on lands leased from the City of Toronto.





The CPR has a joint operating agreement on the CNR trackage between Toronto and Hamilton. It was determined that CNR would grant running rights for the operation of a commuter service. In addition to this the CNR would operate the service under contract to the Provincial Government on a yearly fee basis. This latter is still being negotiated, but basically represents the sharing of the direct cost of joint use of right-of-way trackage, signals and the maintenance of these, plus the crewing costs and equipment maintenance.

Simply, the railway will man the trains, control daily operations, handle ticketing and administration and maintain the equipment, but the government will specify the type of service, fare levels, schedules and other policies, supply the capital and receive the revenue.

#### GOVERNMENT DECISION

These factors were placed before the Technical Advisory and Executive Committees in November, 1964 with the recommendation that:

1. A 2 to 3 year trial expanded commuter rail service on the CNR Lakeshore Lines between Pickering (Dunbarton)



on the east and Burlington on the west should be considered, to replace the present 4 commuter trains per day operated by the CNR.

2. Such an increased operation could provide 20-minute service in the peak periods (generally 7:30 to 9:00 and 4:30 to 6:00) and 60 minute service in off-peak periods (6 a.m. to midnight) and a 90-minute service on Saturdays, Sundays and holidays.

3. Such an increased service can provide comparative travel time to the automobile between Union Station and outer stations.

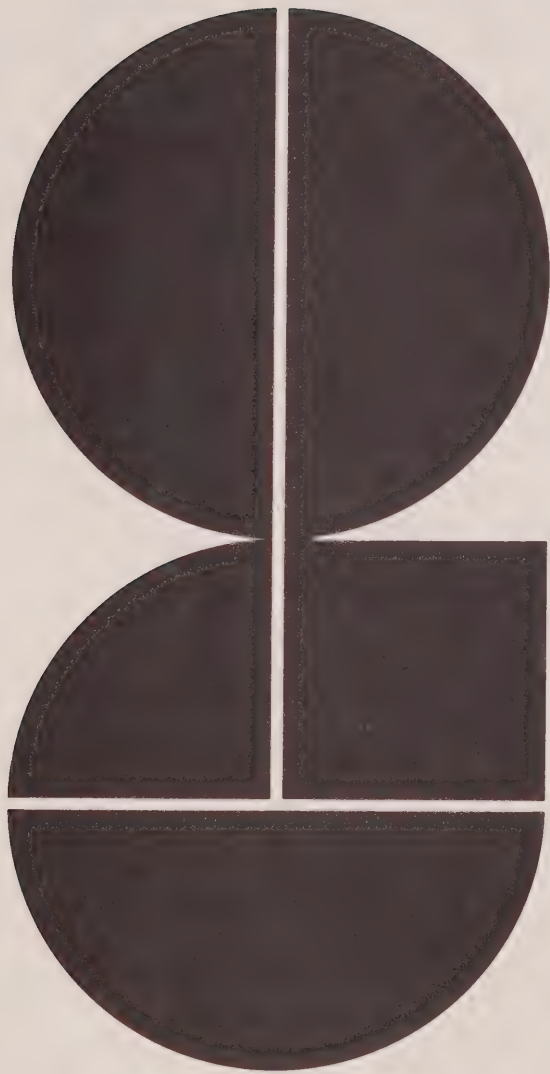
4. Such an operation will provide a service for a distance of 52 miles across one of the most active economic and populous regions in Canada.

5. Such an operation involves the dropping of certain stations to provide a station spacing to permit faster and more efficient operation.

6. Such an operation would provide a complete service of peak and off-peak, Saturdays, Sundays and holidays and for both the east and west sides of Union Station rather than a partial service.







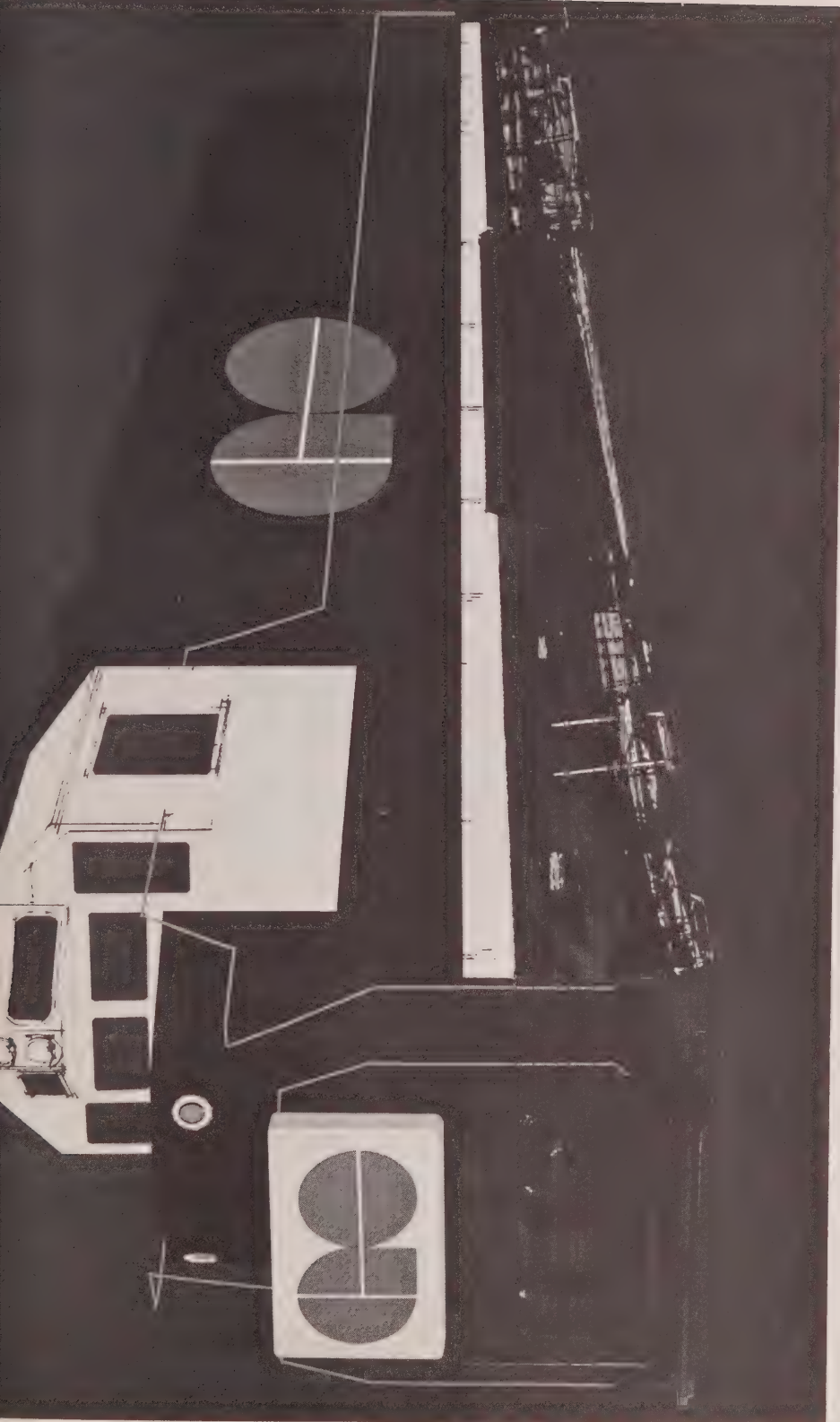
Government of Ontario Transit symbol in the bright green of the field of the Provincial Coat-of-Arms. The letters G and O are welded together by the white bars of the letter "T" laying on its side.



7. Such an operation might commence in the fall of 1965 using second hand refurbished equipment with a capital outlay on the order of \$5.5 Million or in the fall of 1966 using new equipment with a capital outlay on the order of \$7.5 Million.
8. Such an operation has an estimated passenger potential of 4 million per year.
9. Such an operation at present fare rates would produce an annual revenue on the order of \$1.3 Million, but that a fare increase with an increase in service would be reasonable without significant loss of patronage. In any case, a deficit of revenue to operating cost on the order of \$1.5 to \$2 Million was probable.
10. That the operating agency for such a service be the Canadian National Railways.

Altogether, it was a pretty bleak proposal to offer. But again, the Province of Ontario demonstrated its bold approach to the problems of transportation, and in doing so made a critical decision to accept deficit financing in the field of public transportation. The decision was announced in May, 1965 by the Hon. John P. Robarts, Premier

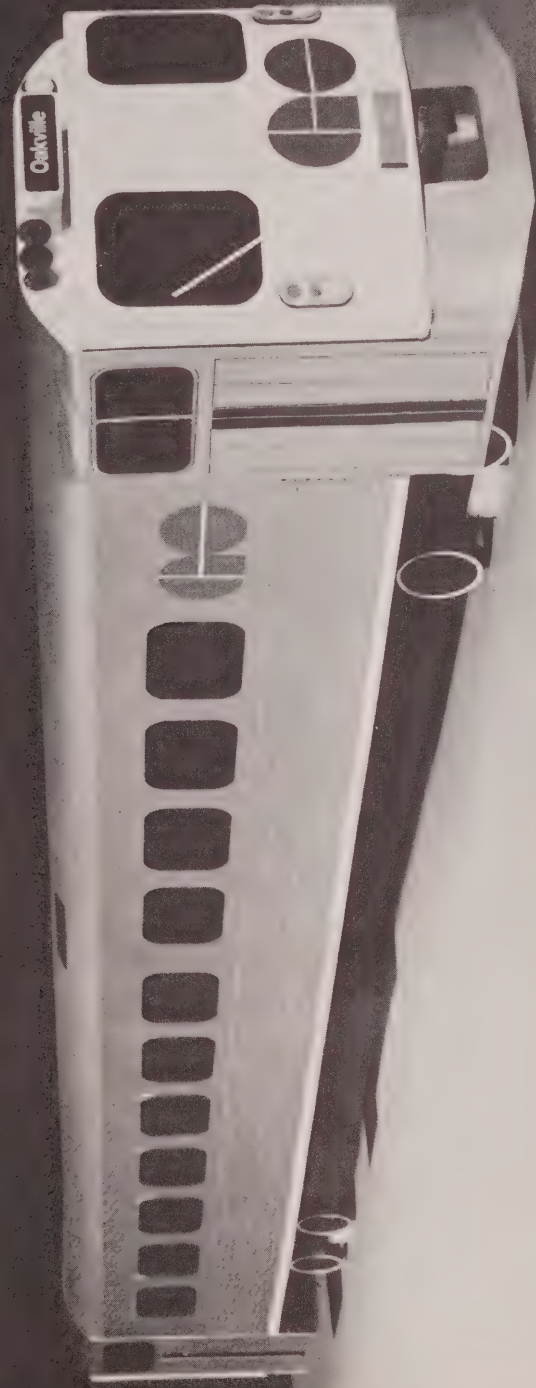




GO Transit Locomotive - modified General Motors Diesel GP 40 - 3000 hp locomotive; two-axle trucks; standard bed extended 10 feet to take 575 volt, three phase 60-cycle diesel generator; Westinghouse 26 L brakes; composition brake shoes.

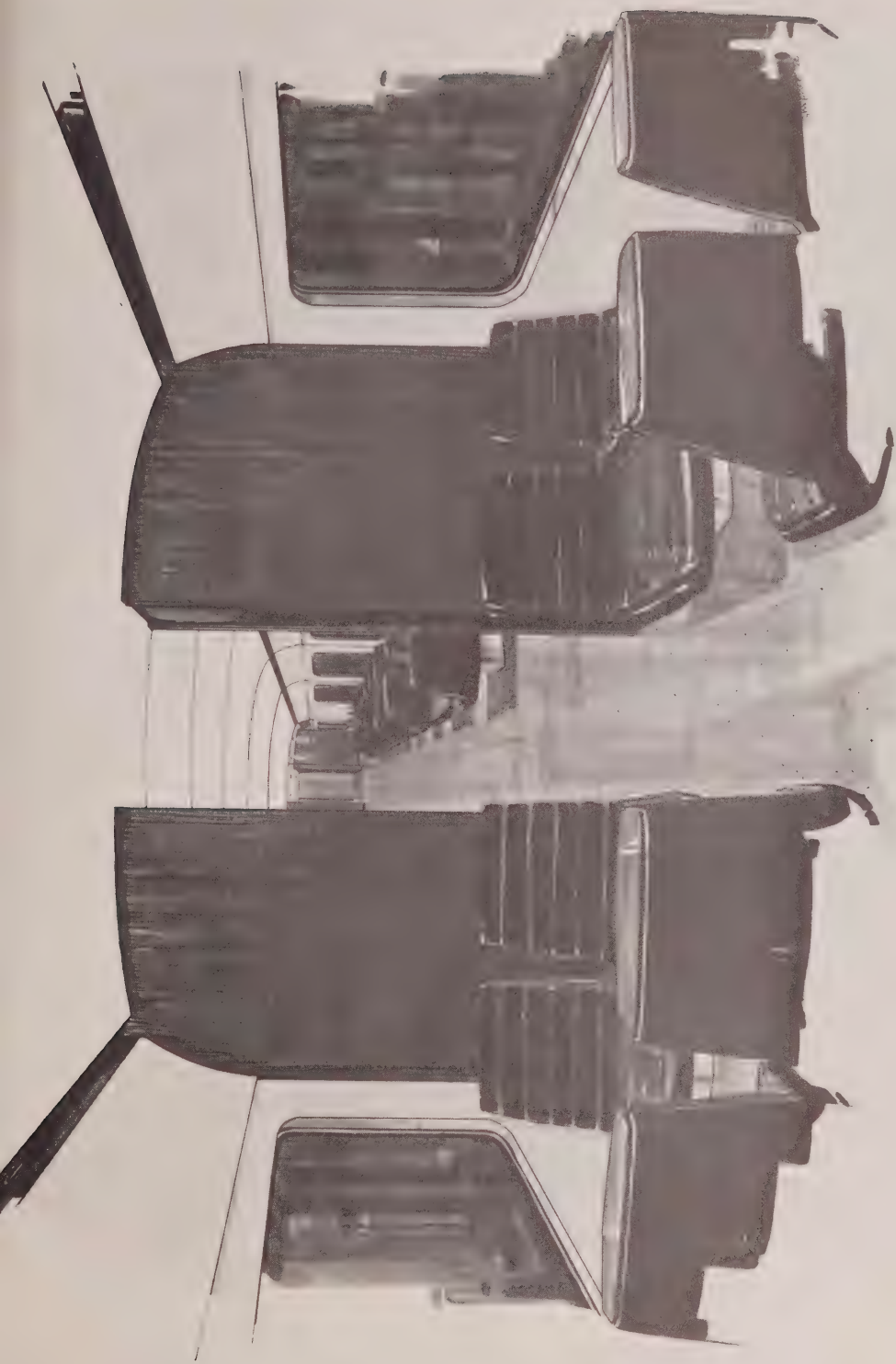






GO Transit Coach Exterior - 85 foot car length; brushed aluminum finish; 65,000 pound weight; 800,000 pound buff strength; 30 inch wheel; air cushioned truck; 54 inch folding vestibule doors operated from central control in any stair-well; end caps white for accent. Rail diesel car similar in appearance, powered with Rolls Royce engine and General Motors auxiliary generator for heating and air conditioning.





GO Transit Coach Interior - translucent off-white ceiling concealing fluorescent lighting; rosewood finished bulkhead division (for emergency equipment and piping to rail diesel car roof mounted radiator and fans); large tinted glass single glaze picture windows; air conditioned; electric heating.





G0 transit Coach Interior - soft bucket type seat in black or beige with arm rest containing ash tray between seats; Coved floor to wall for easier cleaning; floor of poured highly durable plastic material in marble appearance of all colours used in decor; vestibule walls in soft green. Seated capacity 94.





of Ontario who said in part:

" This service is looked upon as something of a pioneering project, insofar as it is the first time that any government in Canada has undertaken this kind of an operation to provide frequent and fast (suburban) mass transportation."

"Although the service is being introduced as an experimental pilot project to fully assess its acceptance and capabilities, the government looks to it with high hope of success so that it might be adopted more extensively in the region and, possibly, other parts of the province."

With the announcement of the government's decision came the direction to include new equipment with air conditioning in the coaches, full service schedule including Saturdays, Sundays and holidays, and acceptance of a starting date in late 1966 or early 1967. Statutory authority was provided with the passage of "An Act for the Establishment and Operation of Commuter Services" at that sitting of the Legislature.



### Implications of Decisions

The general concept of the proposed service had been accepted, the next problem was to proceed with detail development. The following partial list will provide some insight into the magnitude and complexity of matters to be covered and decisions reached. The first item has been expanded slightly to indicate some of the detail. Each item could similarly be broken down.

- A. Equipment Design-Coach seating - 3-2 or 2-2 flop-over or fixed; through aisle or broken aisle; sectionalized or solid slab; fabrics and slab thickness; compartmentalized or not; arm rest etc.
  - Coach colours - same in all cars; interior; interior materials - walls, floors, ceilings, seats; exterior, lighting; floors; etc.
  - Coach fittings - coat hooks; parcel racks; advertising card holders; hand holds - seats and ceilings; tinted window glass; double glazed windows; drinking water; toilets; ashtrays; aisle widths; door widths, type and location; vestibule design; door closure controls; train intercom; braking capacity; coil or air suspension etc.
  - Locomotives - maintenance schedules, spare parts, braking requirements. etc.
- B. Equipment Specifications, Advertising, Tenders and Delivery etc.
- C. Station Location, Design, Property Acquisition, Construction etc.
- D. Parking Lot, Location, Design, Property Acquisition, Construction etc.



- E. Operating Agreement Negotiations.
- F. Rail Engineering - turn outs, Switch locations, industrial spur interference, turn around facilities, signalling, fueling and maintenance facilities and procedures, storage facilities etc.
- G. Advertising Publicity and Printing.
- H. Train Schedules and Consists etc.
- I. Fare Structure, Fare Schedule, Ticketing and Ticket Handling etc.
- J. Bus Feeder Operations and Arrangements.
- K. Equipment Maintenance Schedules and Requirements.
- L. Crewing requirements, Scheduling and Arrangements.
- M. Data Collection, Surveys and Analysis before and during the service.
- N. Requirements and Collaboration with the Federal Board of Transport Commissioners.
- O. Security, Policing, Accidents, and Claims.
- P. Accounting Procedures, Coordination and Auditing for Capital Purchases, and all chargeable items.

As an interesting - and not necessarily frivolous exercise, the reader might attempt to list the advantages and disadvantages of providing passenger drinking water facilities in-car and make a decision for or against their being included in debate with a colleague.





All items and their detailed requirements were put to the CPM procedure to maintain an order to the work and a direction of effort. Quite naturally, the purchase and supply of the rolling stock was of first criticality.

#### Purchase of Rolling Stock

With the closest co-operation of the Canadian National Railways, specifications for locomotives and coaches were developed. Because of the shortage of time; it was decided to use a "performance" specification rather than a "design" specification. Tenders were called on June 10, 1965, and opened July 20, 1965. They were made available on an international basis. The tender for locomotives was awarded to General Motors Diesel Ltd. for eight - 3000h.p. diesel electric locomotives of the GP 40 series with modifications of the braking system and auxiliary diesel generator for heat, light and air conditioning of the train coaches. Top speed capability was to be 33 m.p.h. The total tender price was \$2.0 Million. The tender for coaches was awarded to Hawker-siddeley Canada Ltd. at \$4.1 Million for the supply of 40 coaches and 9 rail diesel coaches (these latter having become recently available.)



Delivery of all rolling stock was to be made on or before December 31, 1966. For practical reasons (running-in equipment, training crews, testing of schedules etc.) the inauguration of the service was adjusted to the spring of 1967 and the CPM criticalities adjusted accordingly.

### System Identification and Visual Design

Since the project was to be a new service concept, it was decided that it should have system identification. Through the Visual Redesign Group of the CNR and an Industrial Design consultant a proposal was developed which would carry the identification into all aspects of public contact. Some of these are shown in the attached figures and include a name and symbol; colours; car interior and exterior; locomotive exterior; advertising, etc. The basic colour identification with the service is a bright green which is also the field colour of the Ontario Coat of Arms. The exterior of the coaches is brushed aluminum, with white endcaps. The interior of the coaches will be finished in soft tones of off-white, beige, brown, and solid accents of black and green. The bucket type seats have beige or black covers. The floor is a new process of poured continuous sheet plastic material with a marbled surface matching the interior decor. The ceilings are slightly arched translucent plastic concealing the fluorescent lighting.

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The total concept being carried through the equipment and station areas is one of a bright, clean, comfortable and uncluttered public transport system dedicated to the passenger.

#### Station Locations

The station locations proposed in the market feasibility were carefully reassessed. More refined information on land availability costs was obtained by real estate appraisal; the community impact was explored with municipal officials; operating characteristics of the rolling stock on order were re-examined, and the position with respect to the removal of the CNR commuter trains was reassessed. This resulted in approval of the dropping of the three stations, as proposed in the preliminary investigation (Lorne Park, Lakeview, Dixie Road); the relocation of three of the proposed stations (Clarkson, Long Branch and Pickering) and the inclusion of Hamilton rather than Burlington as the terminal.





Final Station Locations are:

West

Union Station Mile	0.0
Mimico	6.8
Long Branch	9.7
Port Credit	12.8
Clarkson	16.6
Oakville	21.4
Bronte	25.6
Burlington	32.0
Hamilton	39.3

East

Union Station Mile	0.0
Danforth	5.2
Scarborough	8.8
Eglinton	10.6
Guildwood	12.4
Rouge Hill	16.3
Pickering	20.9
(Dunbarton)	

Train and Fare Schedules

Train and fare schedules have not been formally established as yet. The train schedules will, however, provide for hourly service between 6 a.m. and midnight everyday with 20-minute peak service on weekdays from about 7-9:30 a.m. and 4-6:30 p.m. between Oakville and Pickering (Dunbarton) and two trains in the morning and evening peak periods west of Oakville to Hamilton. Travel time from Pickering (Dunbarton) or Oakville to Union Station will be slightly under 40 minutes.

The fare structure will probably include:

- an adult single fare anytime
- an adult multiple fare anytime
- a child single fare anytime

Several possibilities in fare structure are being explored including:

- flat territory fare
- zone territory fares
- variable fare by mileage travelled
- variable fare by a flat rate plus mileage travelled.



This latter permits an allocation of operating costs into fixed and variable groupings which in turn can reflect the fare paid to receive the service. As previously noted, a deficit between operating cost and revenue is anticipated. There is a choice of applying the deficit to the fixed or the variable costs.

### Market and Service Analysis

As mentioned earlier, the first three years of the Government of Ontario Transit will be subject to intensive study and research.

The project is unique in its scope. No other commuter system in operation or under study can compare with it in terms of the range of objectives to be met, or of the opportunities that it will provide to test the impact of service variations on the travel market. The program of market and service analysis will be a most comprehensive and thorough one. One of the reasons for this is that the experience gained elsewhere in commuter transportation was found to be of little use to us, except to provide our researchers with general guidelines for establishing their program. Two possible reasons for this are (a) generally an older service and area were involved and (b) the test program was not related to the whole corridor market.



The primary objectives of this program are five-fold:

1. To evaluate the success of the service in attracting patronage.
2. Gather information to guide management in the day-to-day operation of the service.
3. Provide guidelines for the planning, design and management of possible further commuter rail services in the study region and other parts of the province.
4. Measure its effect on land use and other forms of transportation in the Study corridors.
5. Add to the fund of information on traffic forecasting models for use in determining the potential for commuter rail service in regional systems planning.

Some of the basic factors that will have to be investigated in order to satisfy these objectives are these:

THE SENSITIVITY OF THE MARKET TO SERVICE FEATURES. This will involve such considerations as the suitability of the schedule to fit the needs of the commuting public and whether the fare structure is reasonable for the service provided.

THE SENSITIVITY OF THE MARKET TO PUBLIC INFORMATION PROGRAMS.

The promotion program for this service is of high importance to its success. In this area of surveying we shall be attempting to measure the effectiveness of our program in making potential passengers aware of the





service and its specific advantages.

TRAVEL CHARACTERISTICS. Here we shall be investigating the frequency of commuter trips made by users and non-users of the service and where they begin and end.

HOUSEHOLD CHARACTERISTICS. In this we shall be attempting to determine whether there are particular occupational income or locational groups that find the service more attractive than others do.

TRAFFIC CHARACTERISTICS. This will involve an analysis of the impact that the service is having on highway and bus-transit traffic volumes in the corridor and a measurement of the number of people carried on each train.

LAND USE CHARACTERISTICS. A survey of this nature will be carried out to determine whether the service has had any particular effect on land values or population densities within the lakeshore corridor.

We shall be using three basic survey techniques in the investigation of these factors. First, the attitudinal technique which is required to gather people's opinions on the convenience of the service and to compare their

The first of these was the discovery of gold in California in 1848. This led to a great influx of people to the West, and the discovery of gold in Nevada in 1859 led to a similar influx. The discovery of gold in Colorado in 1858 and in Idaho in 1860 also led to a great influx of people to the West.

The second of these was the discovery of silver in Colorado in 1859. This led to a great influx of people to the West, and the discovery of silver in Nevada in 1863 led to a similar influx. The discovery of silver in Colorado in 1861 and in Idaho in 1862 also led to a great influx of people to the West.

The third of these was the discovery of copper in Arizona in 1851. This led to a great influx of people to the West, and the discovery of copper in Nevada in 1859 led to a similar influx. The discovery of copper in Colorado in 1861 and in Idaho in 1862 also led to a great influx of people to the West.

The fourth of these was the discovery of iron in Colorado in 1859. This led to a great influx of people to the West, and the discovery of iron in Nevada in 1863 led to a similar influx. The discovery of iron in Colorado in 1861 and in Idaho in 1862 also led to a great influx of people to the West.

The fifth of these was the discovery of lead in Colorado in 1859. This led to a great influx of people to the West, and the discovery of lead in Nevada in 1863 led to a similar influx.

The sixth of these was the discovery of zinc in Colorado in 1859. This led to a great influx of people to the West, and the discovery of zinc in Nevada in 1863 led to a similar influx.

The seventh of these was the discovery of nickel in Colorado in 1859. This led to a great influx of people to the West, and the discovery of nickel in Nevada in 1863 led to a similar influx.

The eighth of these was the discovery of cobalt in Colorado in 1859. This led to a great influx of people to the West, and the discovery of cobalt in Nevada in 1863 led to a similar influx.

pre-trial intentions with actual choice of travel mode when the service goes into effect.

The behavioural technique will be used to obtain factual information on travel habits, such as origin and destination of each trip, mode of travel used, trip purpose, trip length and so forth.

The third will be the counting technique consisting of various studies to determine numbers of train passengers and measurement of highway traffic volumes.

The data collection program will start with a pre-operation bench-mark personal interview survey. This will be followed by on-train rail user surveys that will be carried out periodically throughout the experimental period. In addition there will be periodical telephone surveys covering a portion of the bench-mark respondents, a portion of the rail users and a randomly selected group who were not interviewed previously.

In attempting to provide a package look at one aspect of the concern of the Metropolitan Toronto and Region Transportation Study, quite naturally, considerable detail has been sacrificed. Those of us who have been



connected with the project have a pardonable enthusiasm and pride in the planning and results of the various efforts that are being put into it. To sum it up, we look to the Commuter Rail service with high hopes of success.

If it is successful, it could mean a reduction in lane-miles of freeway required in the region. If it is successful, it could be the beginning of a regional public mass transportation system. If it is successful, it could have a profound effect on shape and development of the region. If it is successful, it could provide a new dimension in the individual's freedom of choice of home-work location and method of travel.

If accepted by the public, the commuter rail system can be an important part of a plan for a "total" transportation system for the region.

In the words of Highways Minister, the Hon. C. S. MacNaughton "The experience of large city areas on this and other continents clearly shows that the moving of masses of people cannot be left to the private automobile alone."







